MODE 2 ALARM TROUBLE LOCATION

This Section provides alarm trouble location procedures for the ITT D448 multiplex terminal when operated in Mode 2. The procedures can be used to clear any alarm condition.

This Section has been reissued to include information on the handling of MOS-equipped units and to correct Tables A and B.

The information contained in this Section applies only to alarm conditions. For non-alarm transmission and signaling trouble location, refer to Section ITTR-18-543.

WARNING: This equipment contains static-sensitive (MOS) devices. Section ITTR-18-599 contains handling instructions for MOS-equipped units.

Descriptions of the indicators on the Mode 2 common equipment are provided in Table A.

When replacing a unit during trouble location, the options on the new unit should be selected identically to the options on the replaced unit. When a unit is replaced and the trouble does not clear, the original unit should be reinstalled in its position.

Note: In the unlikely case that multiple failures should occur, the failure indications should be cleared in the following order:

(1) PWR FAIL LED on PCU
(2) TPAF LED on TPA unit
(3) NO PULSES LED on LI-2
(4) ERRORS LED on LI-2
(5) FRAME LOSS LED on LI-2
(6) FR LOSS LED on RLU
(7) REMOTE LED on LI-2
(8) RMA LED on TPA unit
(9) TPA lamp on TPA unit

TABLE A

INDICATOR FUNCTION

UNIT	INDICATOR	FUNCTION (WHEN ON)
PCU	PWR FAIL LED (red)*	Indicates one of the following conditions: (a) loss of −48V; (b) overvoltage condition on −5 or −10V (causes PCU to shut down causing power failure); (c) overvoltage condition on −2.5 or −7.5V; (d) undervoltage condition on +7, −2.5, −7.5, −10 or −17V.
LI-2	LINE ERRORS LED (red)*	Indicates bipolar violations being received from incoming T1C line; cannot be turned on during looped conditions.
	NO PULSES LED (red)*	Indicates that no data being received by LI-2 from incoming T1C line.
	FRAME LOSS LED (red)*	Indicates failure to synchronize to incoming data on T1C line by LI-2 demultiplexer.
	LOCAL LED (red)*	Indicates that either frame loss or no pulses indication present at LI-2.
	REMOTE LED (red)*	Indicates that far-end multiplexer or far-end LI-2 is experiencing local alarm and is sending remote alarm code to near-end LI-2.
	PASS LED (green)	Indicates that RLUs of both digroups are synchronizing to TLUs data while data is being multiplexed and demultiplexed by LI-2; can be turned on only when one digroup is looped and FAST TEST button on LI-2 is pressed; will remain on until digroup is unlooped.
	FAIL LED (red)	Indicates that conditions described for PASS LED above are not true; can be turned on only as described above; will remain on until digroup is unlooped.
RLU	FR LOSS LED (red)*	Indicates a failure to synchronize with incoming data.
TPA Unit	TPA lamp (red)*	Indicates that trunk processing is taking place (digroup in alarm) or that a CGA bus has been pulled to ground.
	LCA LED (red)*	Indicates that the LCA bus is active (digroup in local alarm); may be caused by a unit out of its connector or by a failure indicated by an LED on another unit.
	RMA LED (yellow)*	Indicates that the far-end multiplexer is experiencing a local alarm and is sending remote alarm code (all bit 2s are zeros). ***Note:*** If RMA and LCA LEDs are both on, it indicates that the far-end multiplexer is looped (all 1s received by near-end).
	TPAF LED (red)*	Indicates that TPA unit has failed.
	ACO LED (green)	Indicates that the ACO button has been pressed to cut off office alarms.
	LOOP LED (green)	Indicates that the digroup is looped (either by pressing of LOOP button on TPA unit or by inserting shorting plug in LOOP test points on LI-2).
	TP MEM LED (yellow)	Indicates that trunk processing is taking place or has taken place; will turn on only if TP MEM button on TPA unit is in on position (pushed in); will turn off only when TP MEM button is in off position (released).

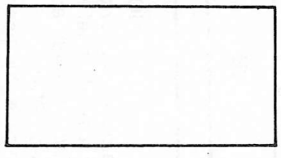
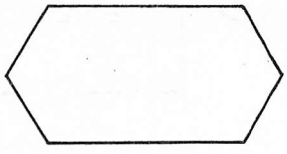
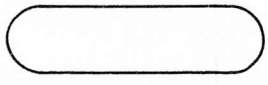
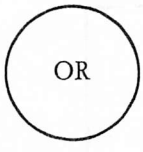
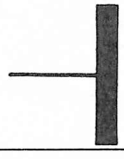
*For the purpose of the procedures in this Section, these indicators are considered alarm indicators.

The trouble location procedures are presented in a GO/NO GO format. All trouble location should begin by performing the procedures in Fig. 1; all detailed trouble location procedures are referenced from Fig. 1. ***Under no circumstances should any trouble location be attempted without first performing the procedures in Fig. 1.***

Descriptions of the symbols used in the GO/NO GO diagrams are provided in Table B.

TABLE B

SYMBOL DESCRIPTIONS

SYMBOL	NAME	DESCRIPTION
	Instruction Block	An instruction block is used to enclose a discrete statement. Each block has a reference number in brackets [ ]. This is for reference only and does not imply sequence.
	Decision Block	A decision block is used to enclose an interrogative statement. Each block has a reference number in brackets [ ]. This is for reference only and does not imply sequence. Each block normally has two responses (Yes-No); however, multiple responses are possible. For example, two "Yes" responses will be numbered Yes (1) and Yes (2). Always try the (1) response first. If the problem is not corrected, repeat the procedure with the (2) response.
	Reference Bubble	A reference bubble is used at the termination of a flowline to represent an exit from that figure or subfigure.
	OR Operation	The OR operation symbol is a junction point within a procedure. It is used where the same result can be accomplished by performing different instructions. Once a single input instruction has been successful, the result has been accomplished.
	End-of-Procedure	The end-of-procedure symbol is used to denote that the flow-charted procedure, as defined by the procedure title, has been completed.

APPARATUS

1—Volt-ohm meter (VOM) (WE KS-14510, Triplett 630, or equivalent)

1—Shorting plug (supplied with equipment)

DIGROUP IN ALARM (TPA LAMP ON)

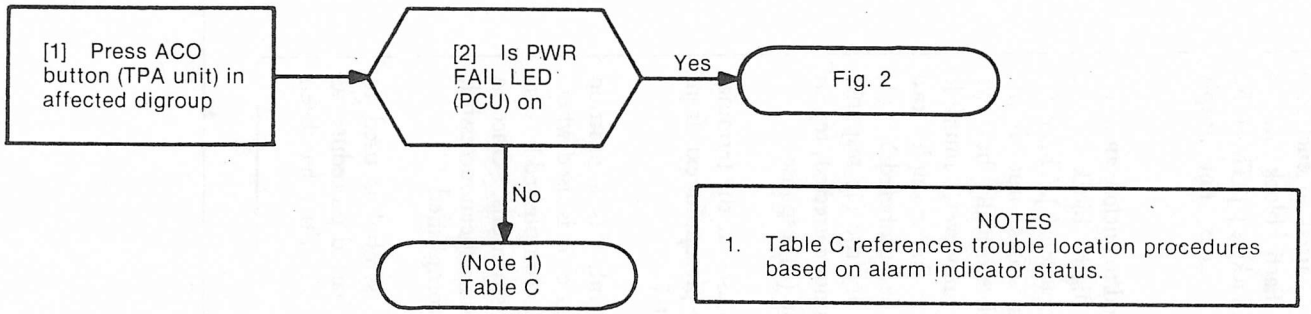

[1] Press ACO button (TPA unit) in affected digroup
[2] Is PWR FAIL LED (PCU) on
Yes
Fig. 2
No
(Note 1) Table C
NOTES
1. Table C references trouble location procedures based on alarm indicator status.

Fig. 1—Digroup in Alarm

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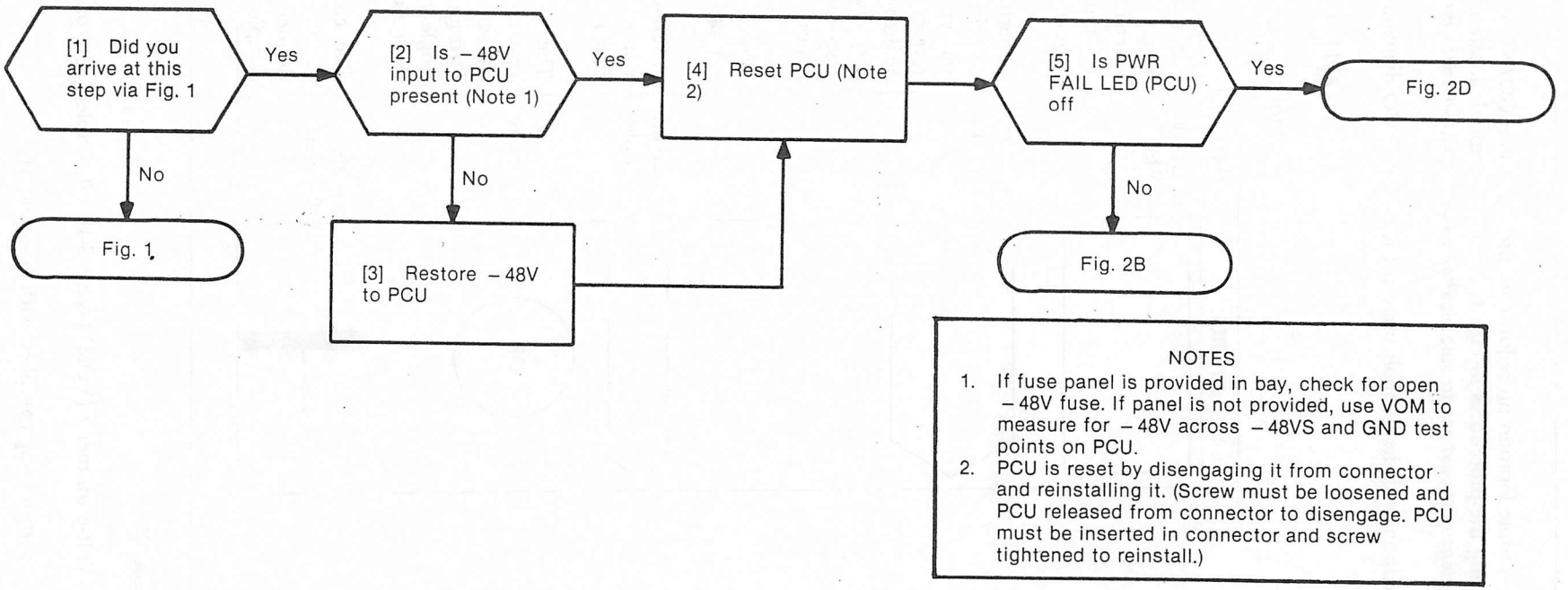

[1] Did you arrive at this step via Fig. 1
Yes
[2] Is −48V input to PCU present (Note 1)
Yes
[4] Reset PCU (Note 2)
[5] Is PWR FAIL LED (PCU) off
Yes
Fig. 2D
No
Fig. 1
No
[3] Restore −48V to PCU
No
Fig. 2B
NOTES
1. If fuse panel is provided in bay, check for open −48V fuse. If panel is not provided, use VOM to measure for −48V across −48VS and GND test points on PCU.
2. PCU is reset by disengaging it from connector and reinstalling it. (Screw must be loosened and PCU released from connector to disengage. PCU must be inserted in connector and screw tightened to reinstall.)

A1807

Fig. 2A—Power Failure Trouble Location

TABLE C

TROUBLE LOCATION PROCEDURES TO CLEAR ALARM

ALARM INDICATOR STATUS†										TROUBLE LOCATION PROCEDURE ‡
TPA UNIT				LI-2					RLU	
RMA	LCA	TPAF	TPA	LINE ERRORS	NO PULSES	FRAME LOSS	LOCAL	REMOTE	FR LOSS	
—	NA	X	X	NA	NA	NA	NA	—	NA	Refer to Fig. 3, Page 8
—	X	—	X	—	X	NA	X	—	NA	Refer to Fig. 4, Page 9
—	NA	—	NA	X	—	—	—	—	NA	Refer to Fig. 5, Page 11
—	X	—	X	NA	—	X	X	NA	NA	
—	X	—	X	—	—	—	—	—	X	Refer to Fig. 6, Page 12
—	—	—	NA	—	—	—	—	X	—	Refer to Fig. 7, Page 15
X	—	—	X	—	—	—	—	NA	—	Refer to Fig. 8, Page 18
—	—	—	X	—	—	—	—	—	—	Refer to Fig. 9, Page 22

† X - indicator is on; — - indicator is off; NA - indicator may be on or off; for any indicator status not listed in this table, contact ITT Transmission Division for assistance.

‡ If any trouble location procedure fails to clear the alarm, contact ITT Transmission Division for assistance.

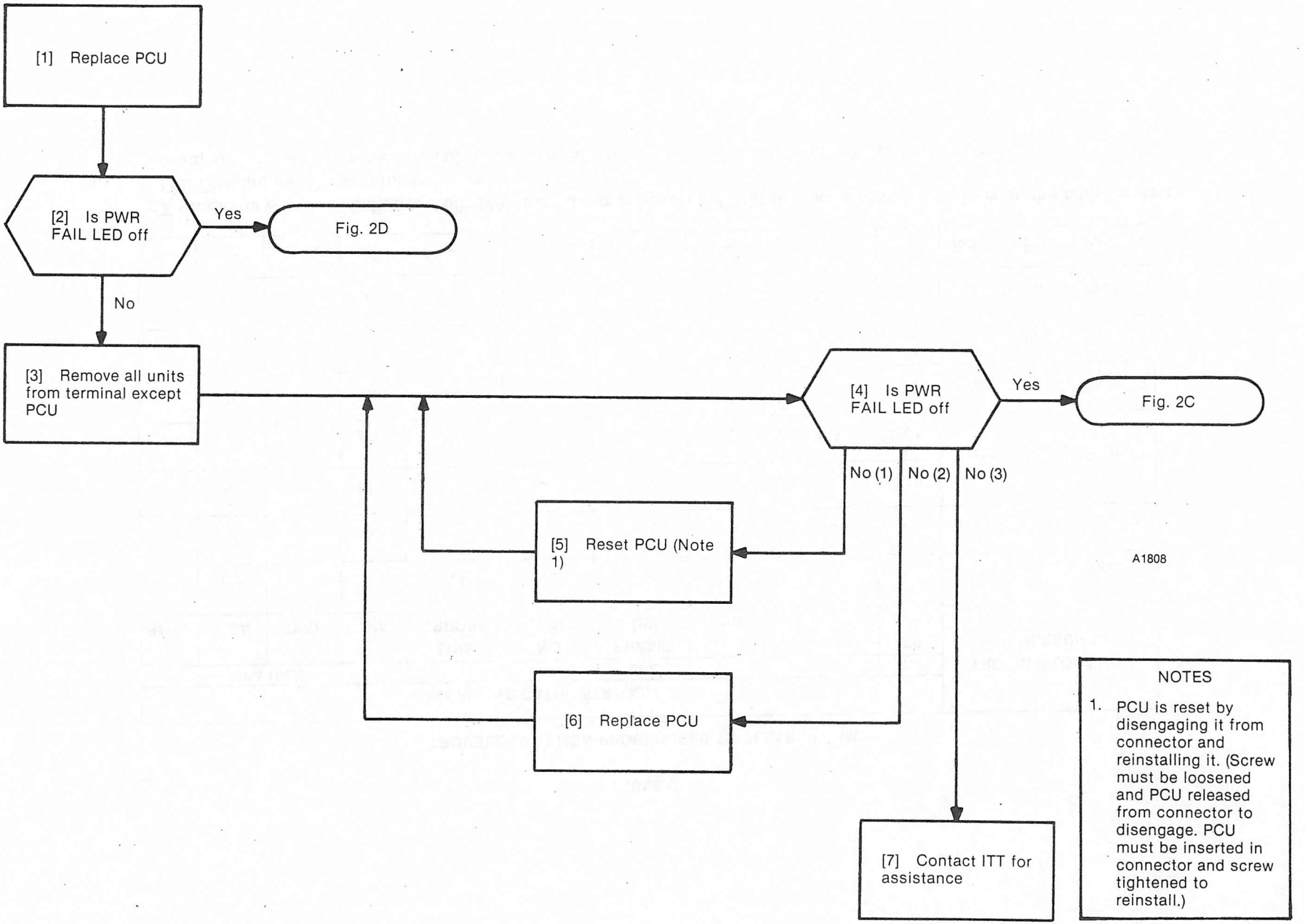
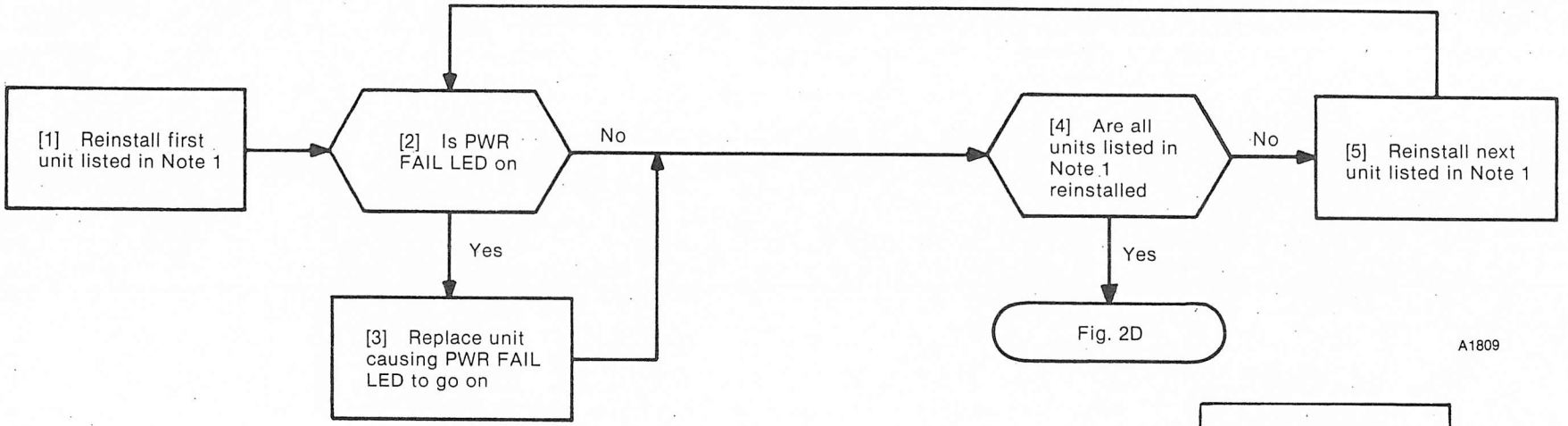

[1] Replace PCU
[2] Is PWR FAIL LED off
Yes
Fig. 2D
No
[3] Remove all units from terminal except PCU
[4] Is PWR FAIL LED off
Yes
Fig. 2C
No (1)
No (2)
No (3)
[5] Reset PCU (Note 1)
A1808
[6] Replace PCU
[7] Contact ITT for assistance
NOTES
1. PCU is reset by disengaging it from connector and reinstalling it. (Screw must be loosened and PCU released from connector to disengage. PCU must be inserted in connector and screw tightened to reinstall.)

Fig. 2B—Power Failure Trouble Location


[1] Reinstall first unit listed in Note 1
[2] Is PWR FAIL LED on
No
Yes
[3] Replace unit causing PWR FAIL LED to go on
[4] Are all units listed in Note 1 reinstalled
No
Yes
[5] Reinstall next unit listed in Note 1
Fig. 2D
A1809

NOTES

1. Reinstall plug-in units in the following order:
   - OIU
   - TIU
   - LI-2
   - TLU (A)
   - RLU (A)
   - TPA unit (A)
   - TLU (B)
   - RLU (B)
   - TPA unit (B)
   - Digroup A channel units
   - Digroup B channel units.

Fig. 2C—Power Failure Trouble Location

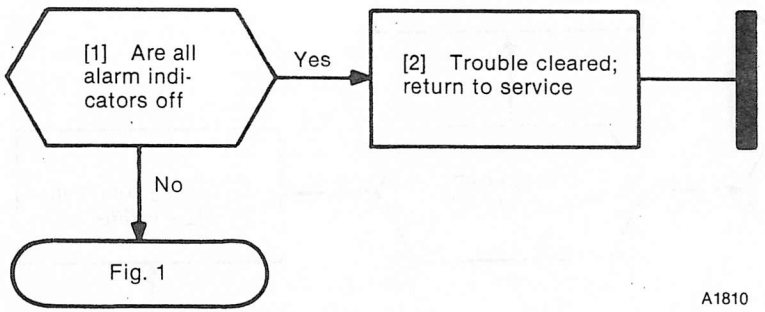


Fig. 2D—Power Failure Trouble Location

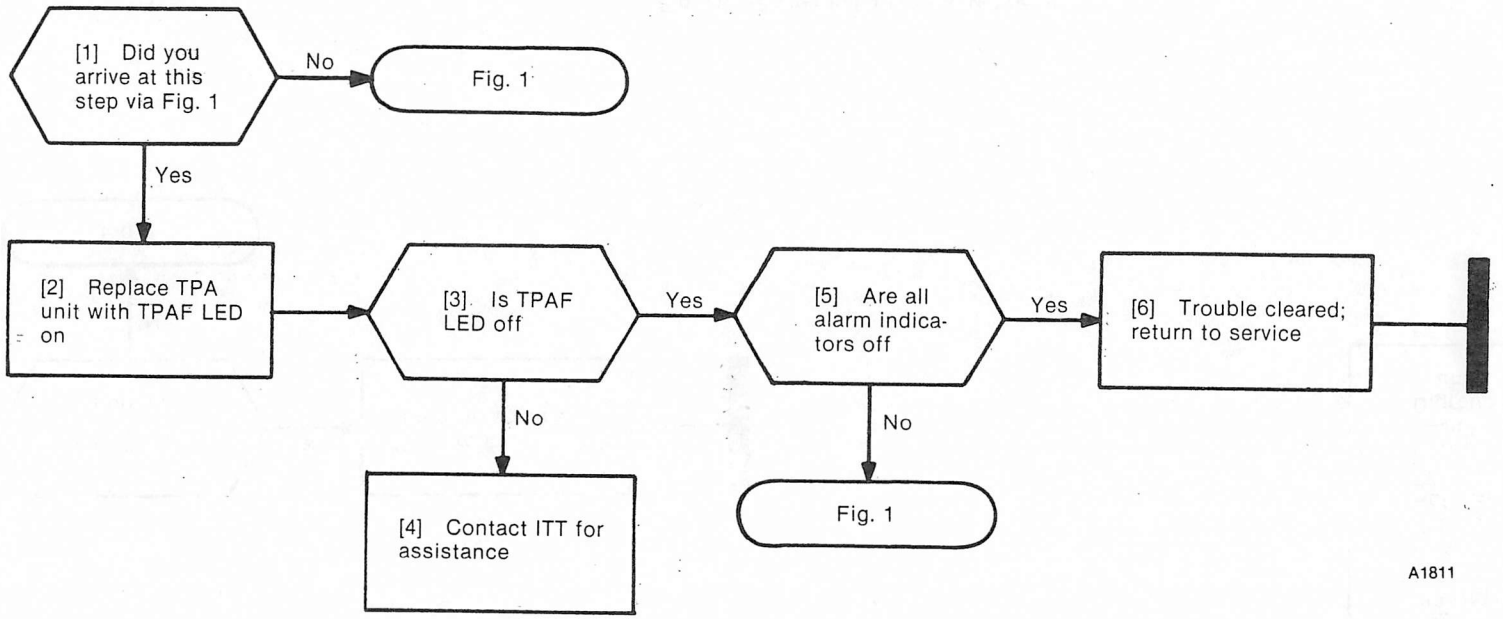


Fig. 3—Local Alarm Trouble Location (TPAF LED On)

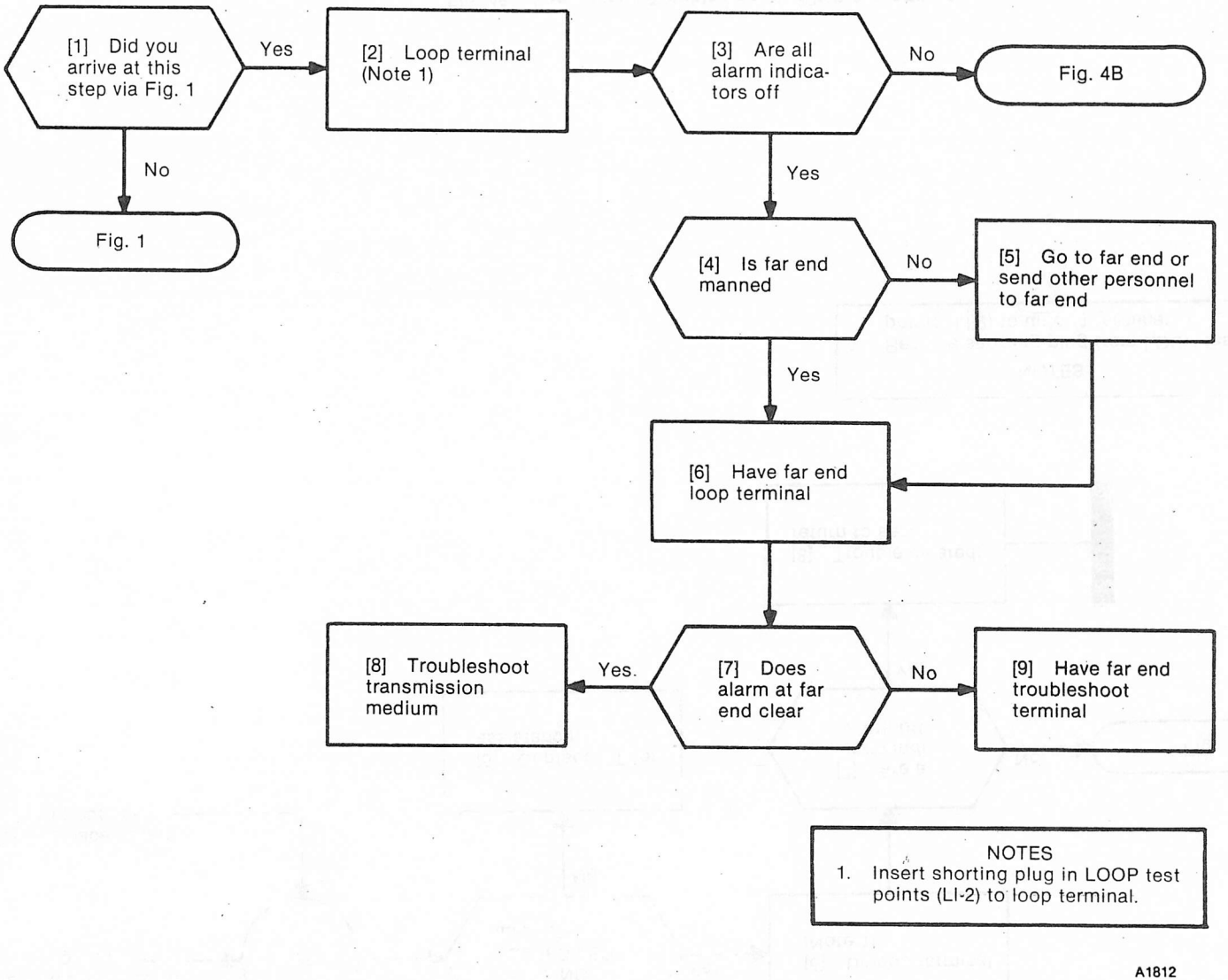

[1] Did you arrive at this step via Fig. 1
Yes
[2] Loop terminal (Note 1)
[3] Are all alarm indicators off
No
Fig. 4B
No
Fig. 1
Yes
[4] Is far end manned
No
[5] Go to far end or send other personnel to far end
Yes
[6] Have far end loop terminal
[8] Troubleshoot transmission medium
Yes
[7] Does alarm at far end clear
No
[9] Have far end troubleshoot terminal
NOTES
1. Insert shorting plug in LOOP test points (LI-2) to loop terminal.
A1812

Fig. 4A—Local Alarm Trouble Location (NO PULSES LED on LI-2 On)

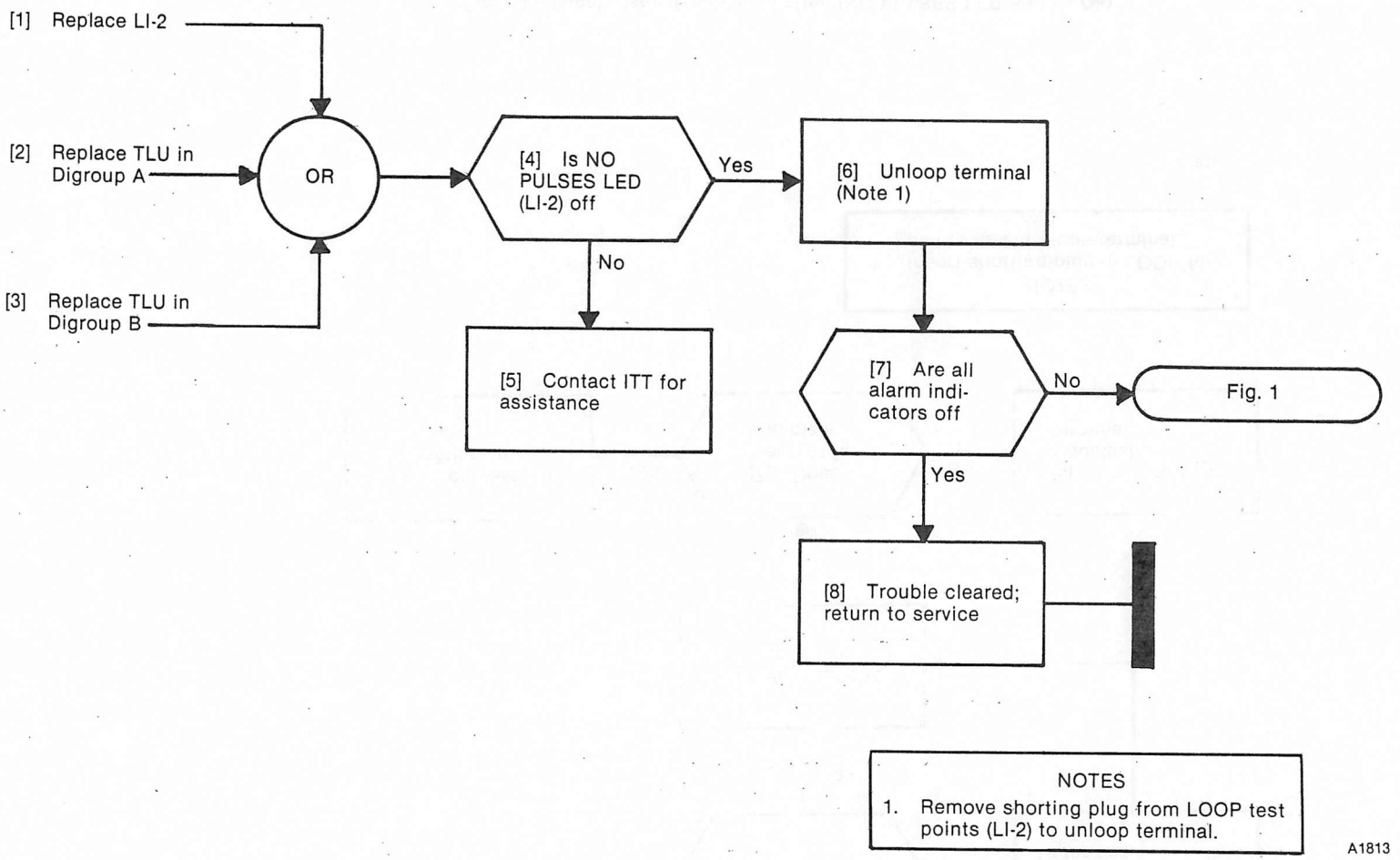


Fig. 4B—Local Alarm Trouble Location (NO PULSES LED on LI-2 On)

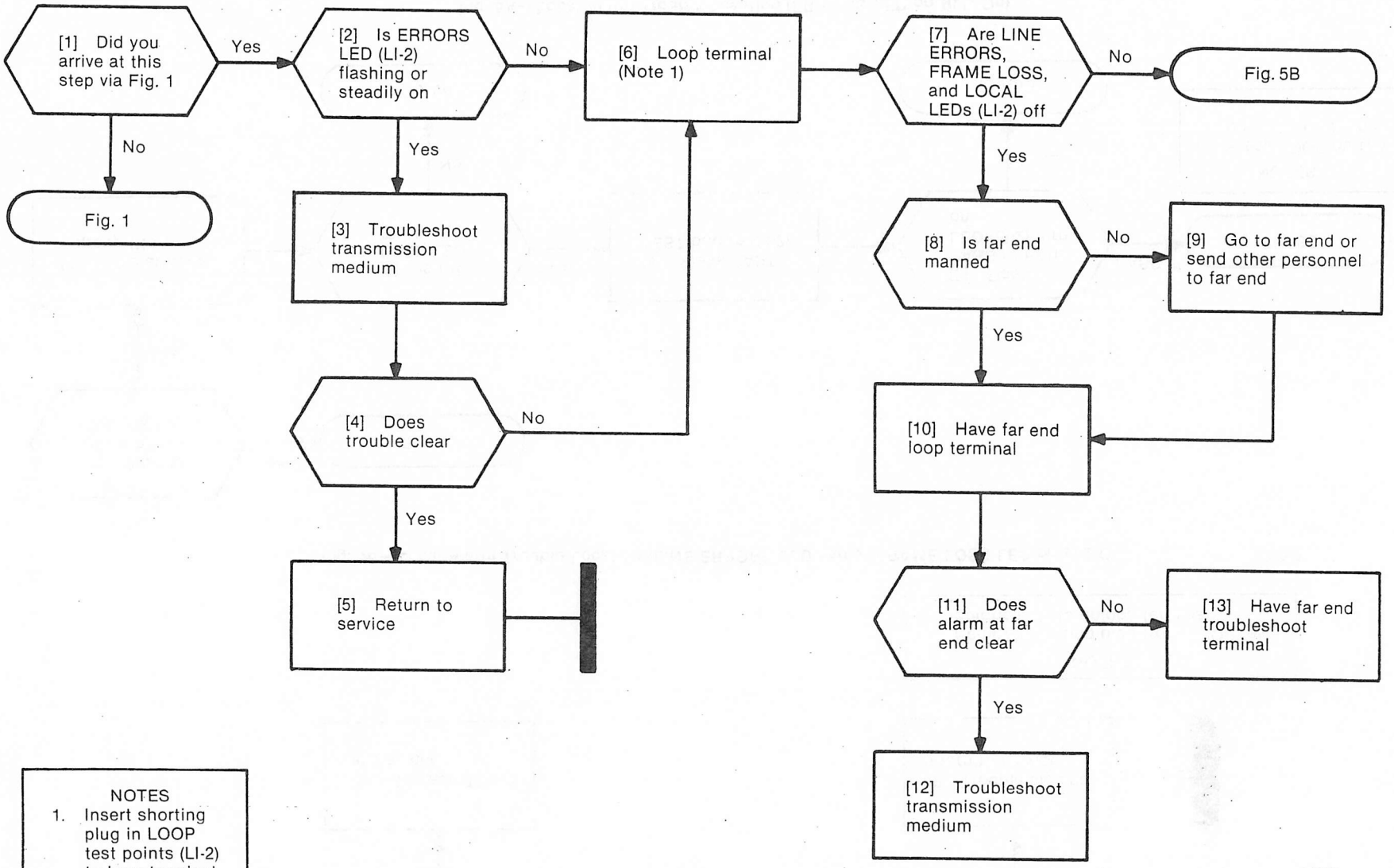


Fig. 5A—Local Alarm Trouble Location (LINE ERRORS LED and/or FRAME LOSS LED on LI-2 On)

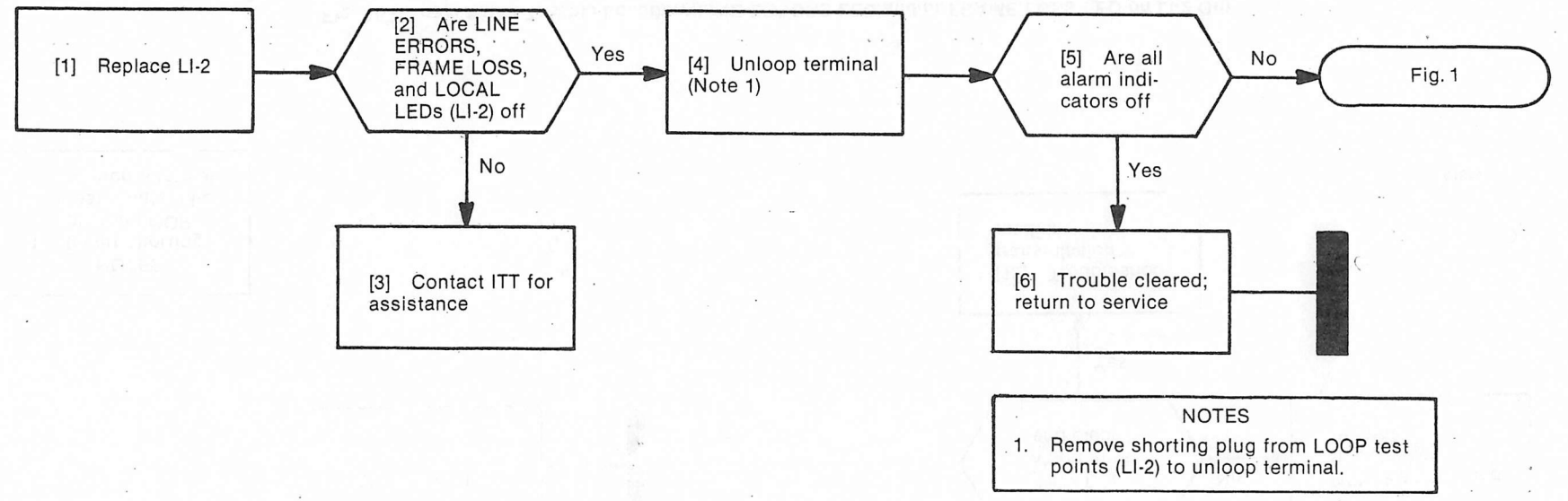
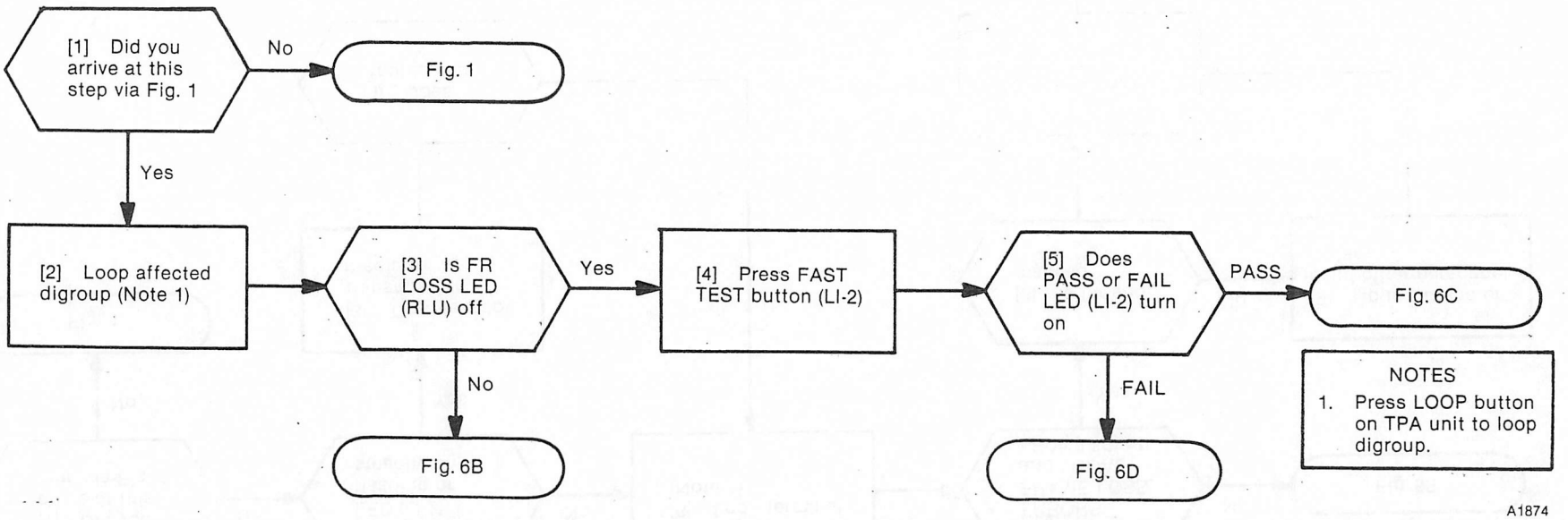

[1] Replace LI-2
[2] Are LINE ERRORS, FRAME LOSS, and LOCAL LEDs (LI-2) off
Yes
No
[3] Contact ITT for assistance
[4] Unloop terminal (Note 1)
[5] Are all alarm indicators off
No
Fig. 1
Yes
[6] Trouble cleared; return to service
NOTES
1. Remove shorting plug from LOOP test points (LI-2) to unloop terminal.

Fig. 5B—Local Alarm Trouble Location (LINE ERRORS LED and/or FRAME LOSS LED on LI-2 On)

A1873



A1874

Fig. 6A—Local Alarm Trouble Location (FR LOSS LED on RLU On)

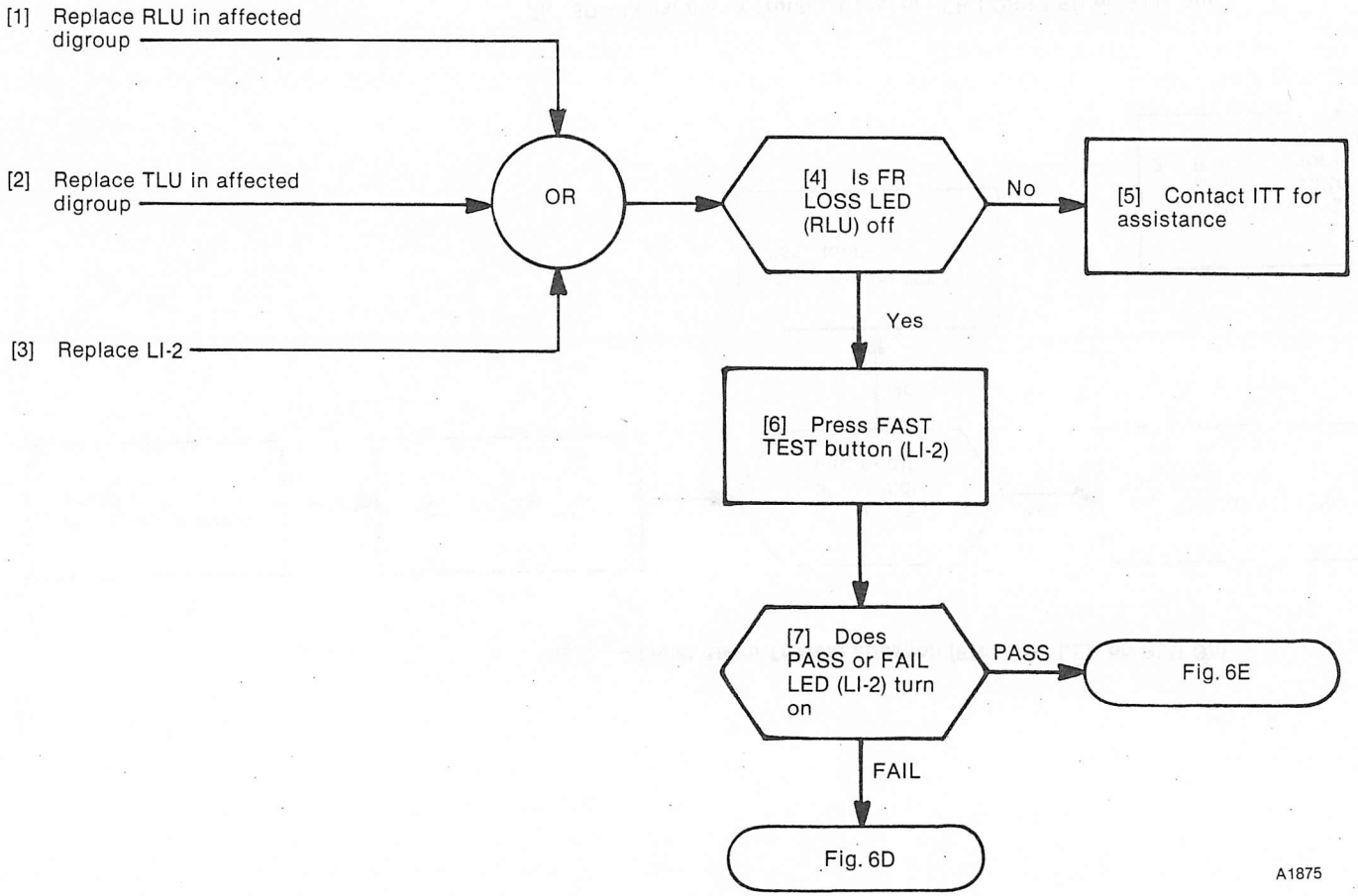


Fig. 6B—Local Alarm Trouble Location (FR LOSS LED on RLU On)

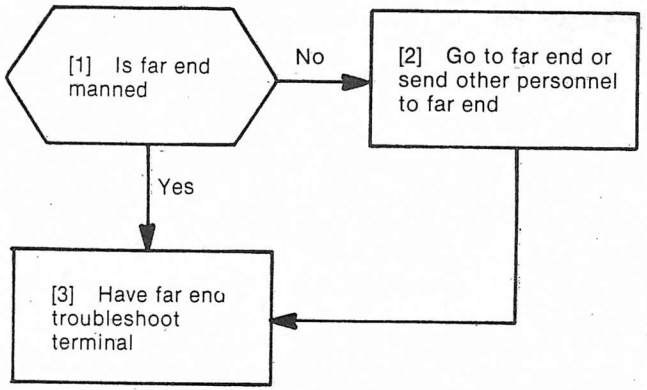


Fig. 6C—Local Alarm Trouble Location (FR LOSS LED on RLU On)

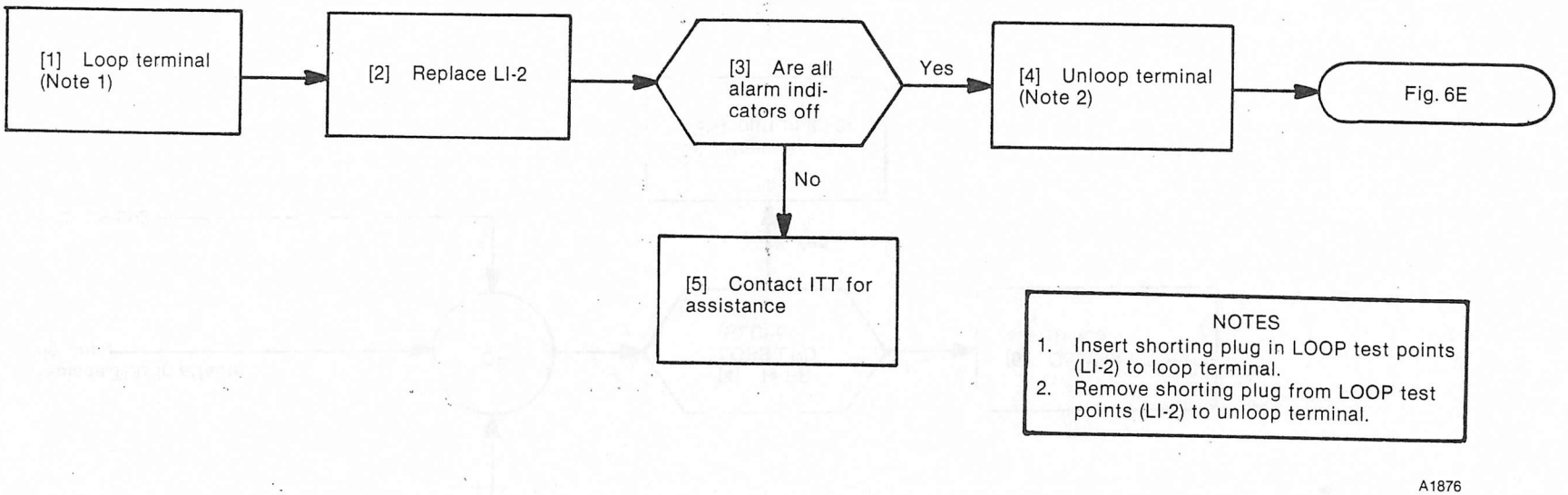

[1] Loop terminal (Note 1)
[2] Replace LI-2
[3] Are all alarm indicators off
Yes
[4] Unloop terminal (Note 2)
Fig. 6E
No
[5] Contact ITT for assistance
NOTES
1. Insert shorting plug in LOOP test points (LI-2) to loop terminal.
2. Remove shorting plug from LOOP test points (LI-2) to unloop terminal.
A1876

Fig. 6D—Local Alarm Trouble Location (FR LOSS LED on RLU On)

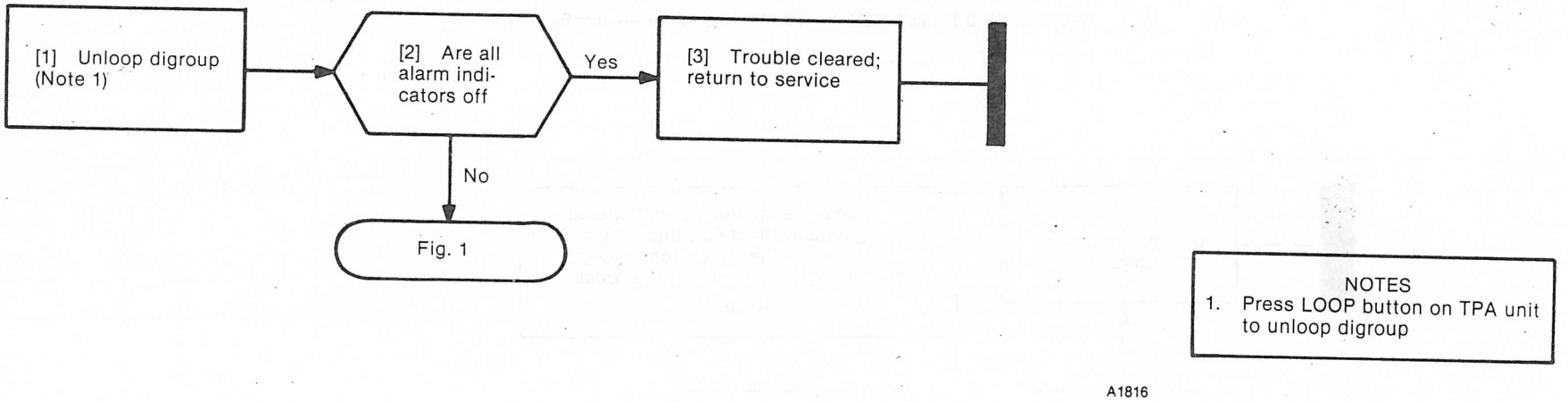


Fig. 6E—Local Alarm Trouble Location (FR LOSS LED on RLU On)

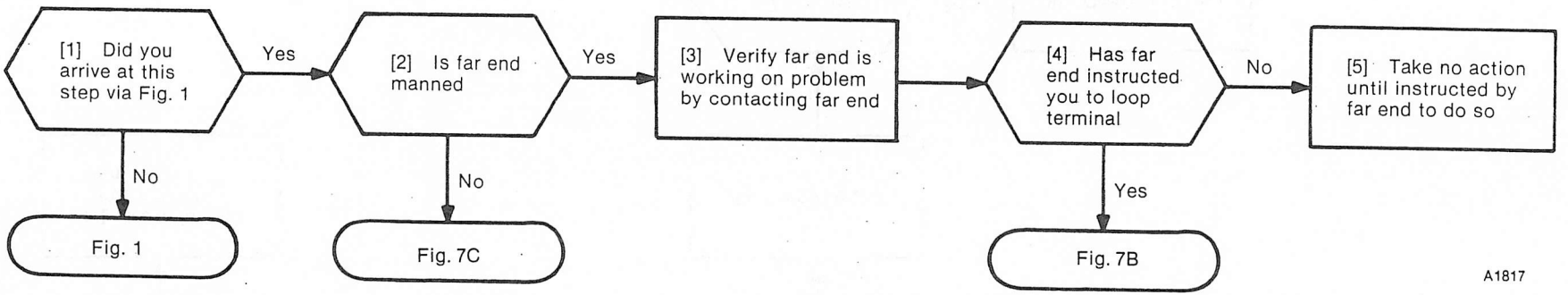

[1] Did you arrive at this step via Fig. 1
Yes
[2] Is far end manned
Yes
[3] Verify far end is working on problem by contacting far end
[4] Has far end instructed you to loop terminal
No
[5] Take no action until instructed by far end to do so
No
Fig. 1
No
Fig. 7C
Yes
Fig. 7B
A1817

Fig. 7A—Terminal in Remote Alarm (REMOTE LED on LI-2 On)

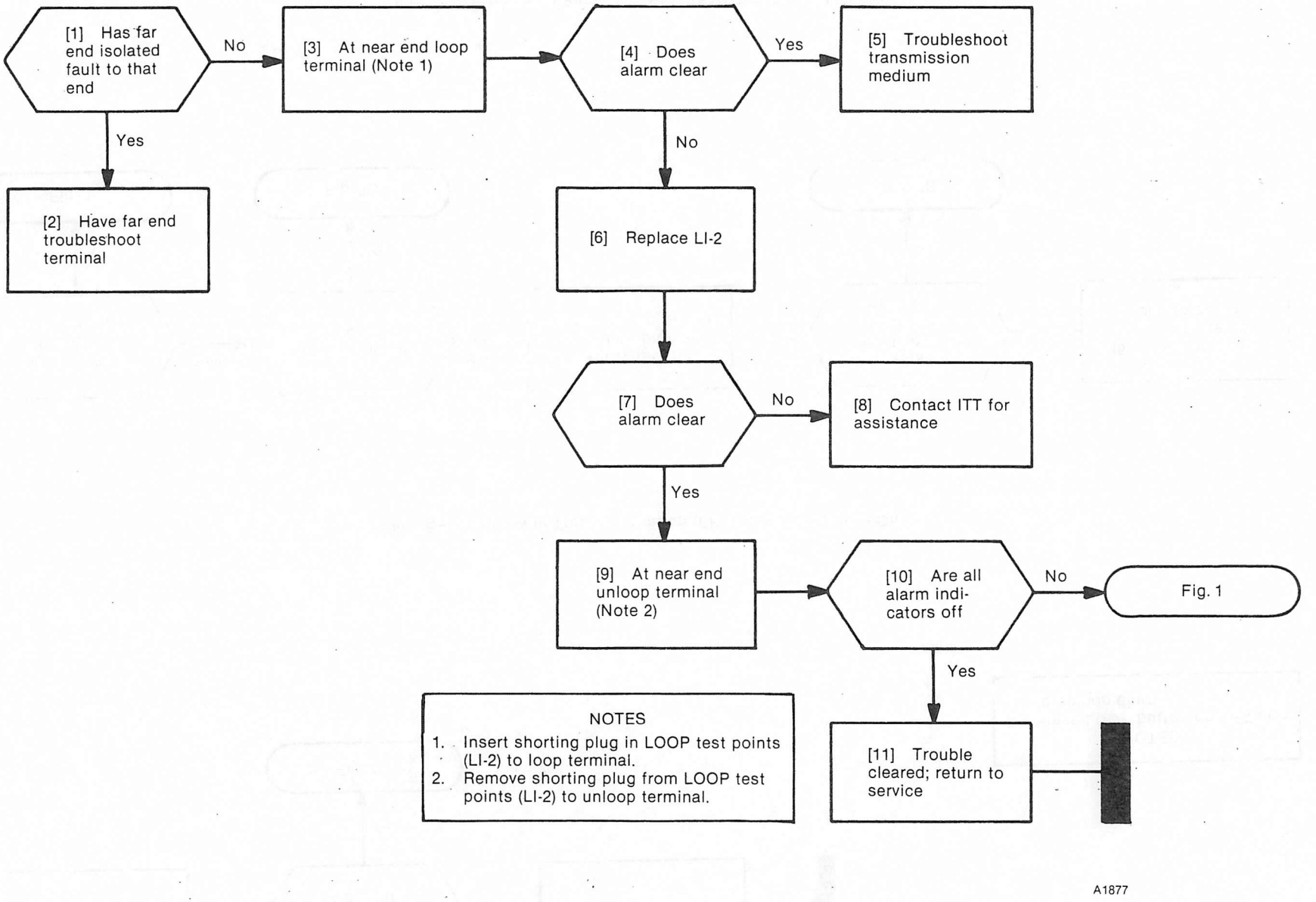

[1] Has far end isolated fault to that end
No
[3] At near end loop terminal (Note 1)
[4] Does alarm clear
Yes
[5] Troubleshoot transmission medium
Yes
No
[2] Have far end troubleshoot terminal
[6] Replace LI-2
[7] Does alarm clear
No
[8] Contact ITT for assistance
Yes
[9] At near end unloop terminal (Note 2)
[10] Are all alarm indicators off
No
Fig. 1
Yes
NOTES
1. Insert shorting plug in LOOP test points (LI-2) to loop terminal.
2. Remove shorting plug from LOOP test points (LI-2) to unloop terminal.
[11] Trouble cleared; return to service
A1877

Fig. 7B—Terminal in Remote Alarm (REMOTE LED on LI-2 On)

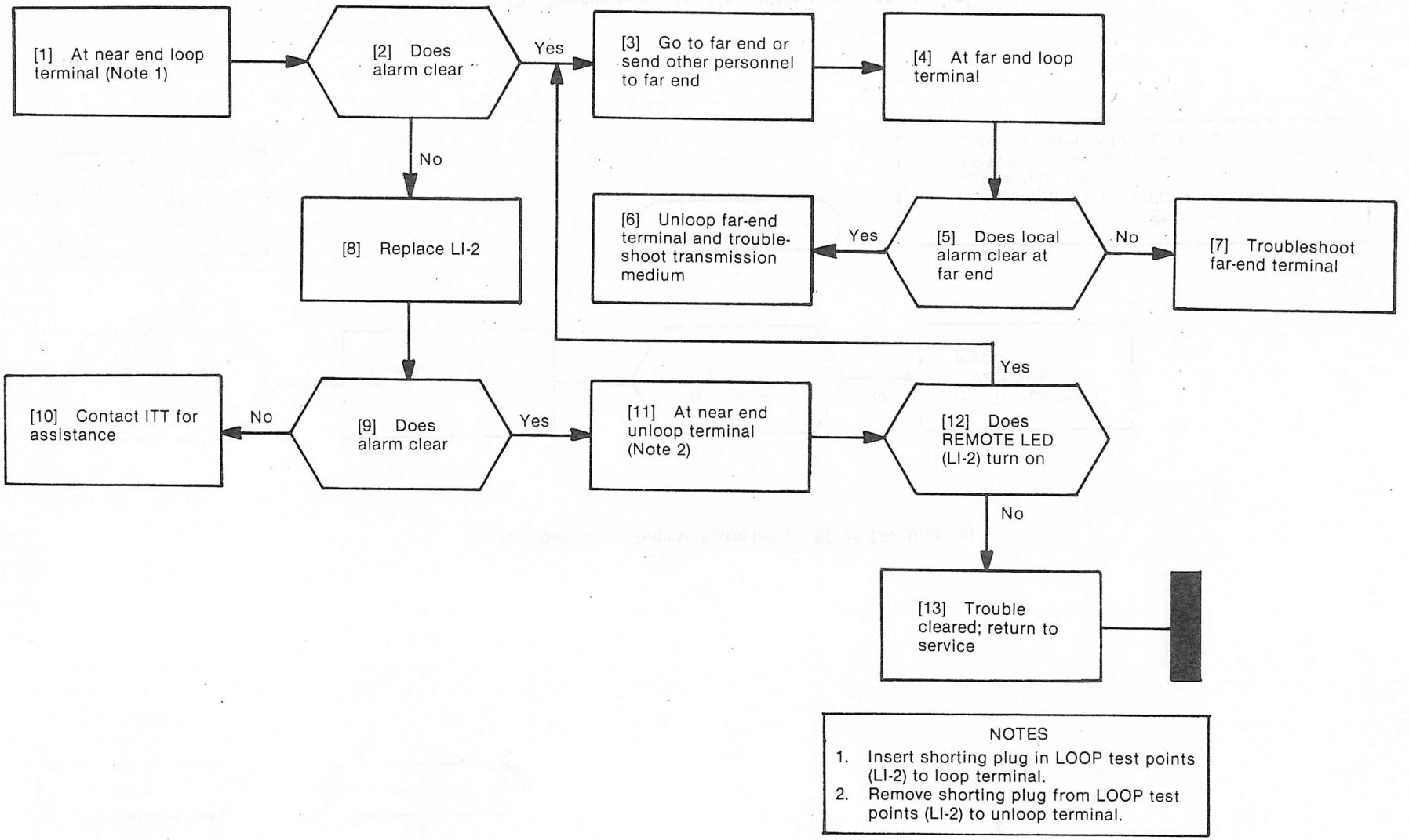

[1] At near end loop terminal (Note 1)
[2] Does alarm clear
Yes
[3] Go to far end or send other personnel to far end
[4] At far end loop terminal
No
[8] Replace LI-2
[6] Unloop far-end terminal and trouble-shoot transmission medium
Yes
[5] Does local alarm clear at far end
No
[7] Troubleshoot far-end terminal
Yes
[10] Contact ITT for assistance
No
[9] Does alarm clear
Yes
[11] At near end unloop terminal (Note 2)
[12] Does REMOTE LED (LI-2) turn on
No
[13] Trouble cleared; return to service
NOTES
1. Insert shorting plug in LOOP test points (LI-2) to loop terminal.
2. Remove shorting plug from LOOP test points (LI-2) to unloop terminal.
A1878

Fig. 7C—Terminal in Remote Alarm (REMOTE LED on LI-2 On)

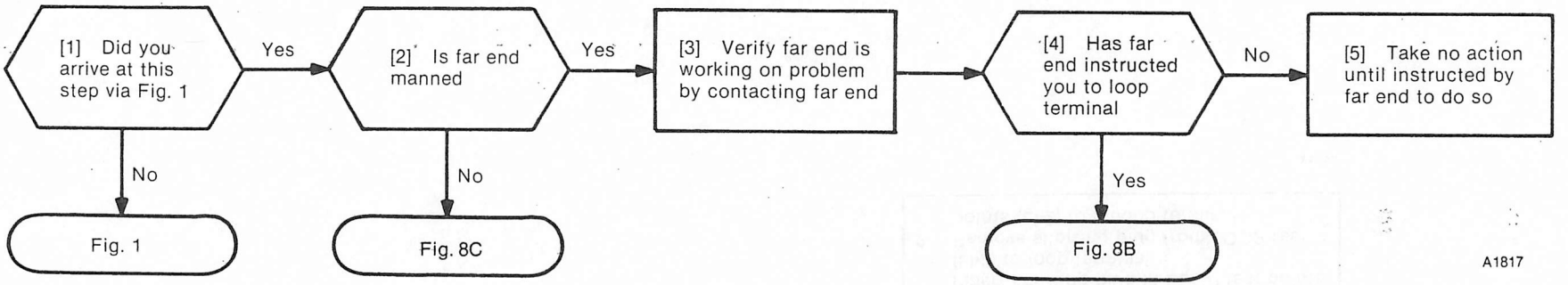

[1] Did you arrive at this step via Fig. 1
Yes
[2] Is far end manned
Yes
[3] Verify far end is working on problem by contacting far end
[4] Has far end instructed you to loop terminal
No
[5] Take no action until instructed by far end to do so
No
Fig. 1
No
Fig. 8C
Yes
Fig. 8B
A1817

Fig. 8A—Digroup in Remote Alarm (RMA LED on TPA Unit On)

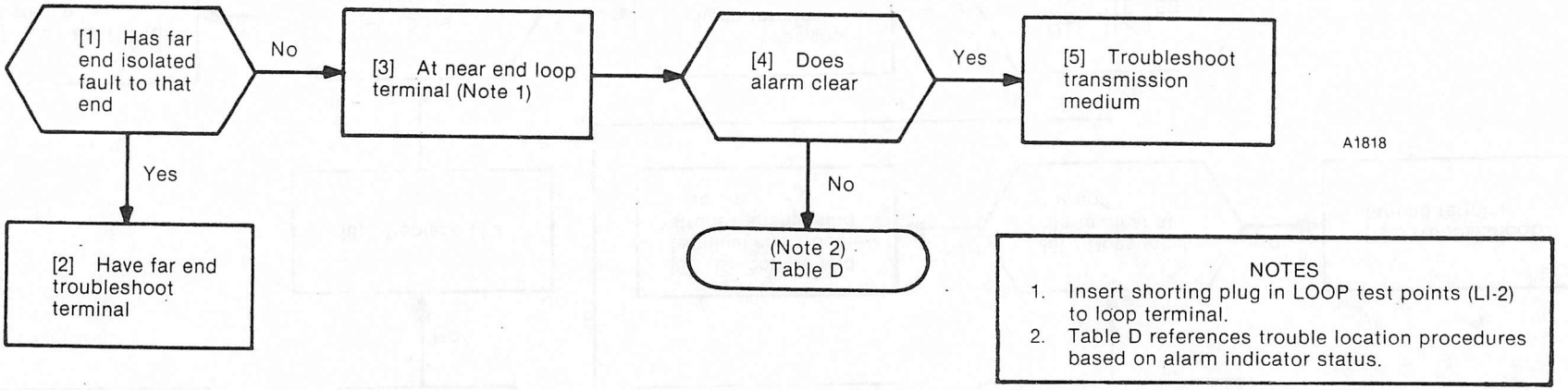

[1] Has far end isolated fault to that end
No
[3] At near end loop terminal (Note 1)
[4] Does alarm clear
Yes
[5] Troubleshoot transmission medium
A1818
Yes
[2] Have far end troubleshoot terminal
No
(Note 2) Table D
NOTES
1. Insert shorting plug in LOOP test points (LI-2) to loop terminal.
2. Table D references trouble location procedures based on alarm indicator status.

Fig. 8B—Digroup in Remote Alarm (RMA LED on TPA Unit On)

TABLE D

TROUBLE LOCATION PROCEDURES TO CLEAR REMOTE ALARM WHEN FAR-END OFFICE IS MANNED

ALARM INDICATOR STATUS†								TROUBLE LOCATION PROCEDURE‡
TPA UNIT		LI-2					RLU	
LCA	TPA	LINE ERRORS	NO PULSES	FRAME LOSS	LOCAL	REMOTE	FR LOSS	
X	X	—	X	NA	X	—	NA	Refer to Fig. 10, Page 23
X	X	—	—	X	X	—	—	Refer to Fig. 11, Page 24
X	X	—	—	—	—	—	X	Refer to Fig. 12, Page 25

†X - indicator is on; — - indicator is off; NA - indicator may be on or off; for any indicator status not listed in this table, contact ITT for assistance.

‡If any trouble location procedure fails to clear the alarm, contact ITT for assistance.

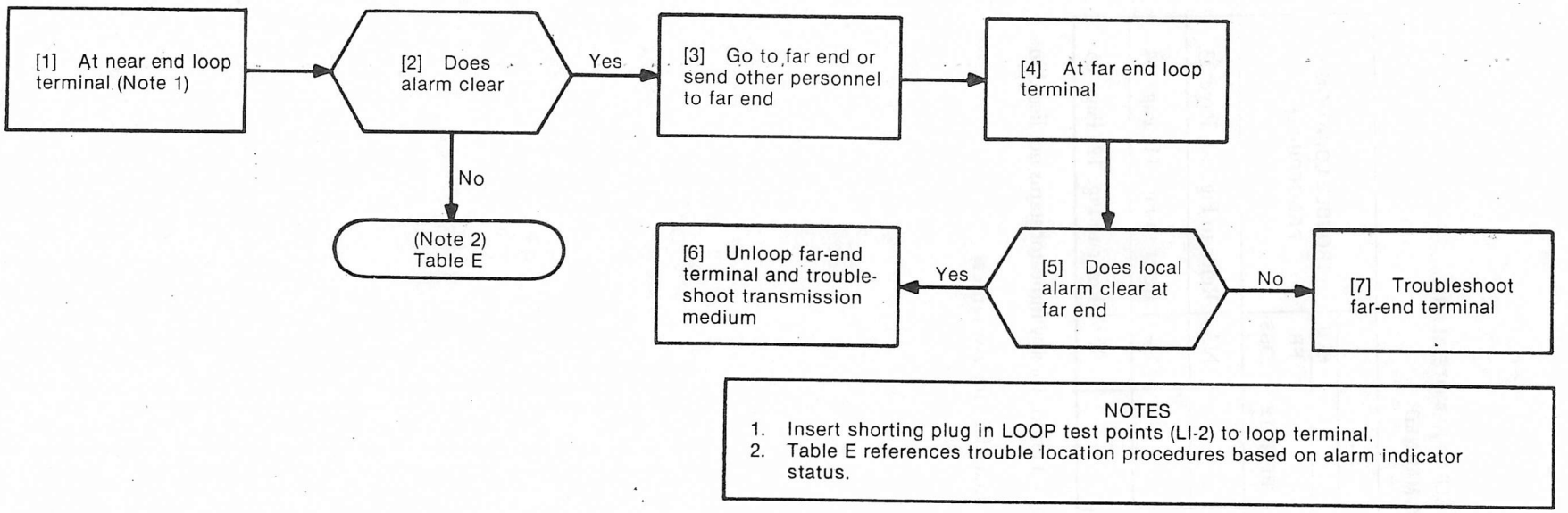

[1] At near end loop terminal (Note 1)
[2] Does alarm clear
Yes
No
(Note 2) Table E
[3] Go to far end or send other personnel to far end
[4] At far end loop terminal
[5] Does local alarm clear at far end
Yes
No
[6] Unloop far-end terminal and trouble-shoot transmission medium
[7] Troubleshoot far-end terminal
NOTES
1. Insert shorting plug in LOOP test points (LI-2) to loop terminal.
2. Table E references trouble location procedures based on alarm indicator status.
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Fig. 8C—Digroup in Remote Alarm (RMA LED on TPA Unit On)

TABLE E

TROUBLE LOCATION PROCEDURES TO CLEAR REMOTE ALARM WHEN FAR-END OFFICE IS UNMANNED

ALARM INDICATOR STATUS†								TROUBLE LOCATION PROCEDURE‡
TPA UNIT		LI-2					RLU	
LCA	TPA	LINE ERRORS	NO PULSES	FRAME LOSS	LOCAL	REMOTE	FR LOSS	
X	X	—	X	NA	X	—	NA	Refer to Fig. 13, Page 26
X	X	—	—	X	X	—	—	Refer to Fig. 14, Page 28
X	X	—	—	—	—	—	X	Refer to Fig. 15, Page 29

†X - indicator is on; — - indicator is off; NA - indicator may be on or off; for any indicator status not listed in this table, contact ITT for assistance.

‡If any trouble location procedure fails to clear the alarm, contact ITT for assistance.

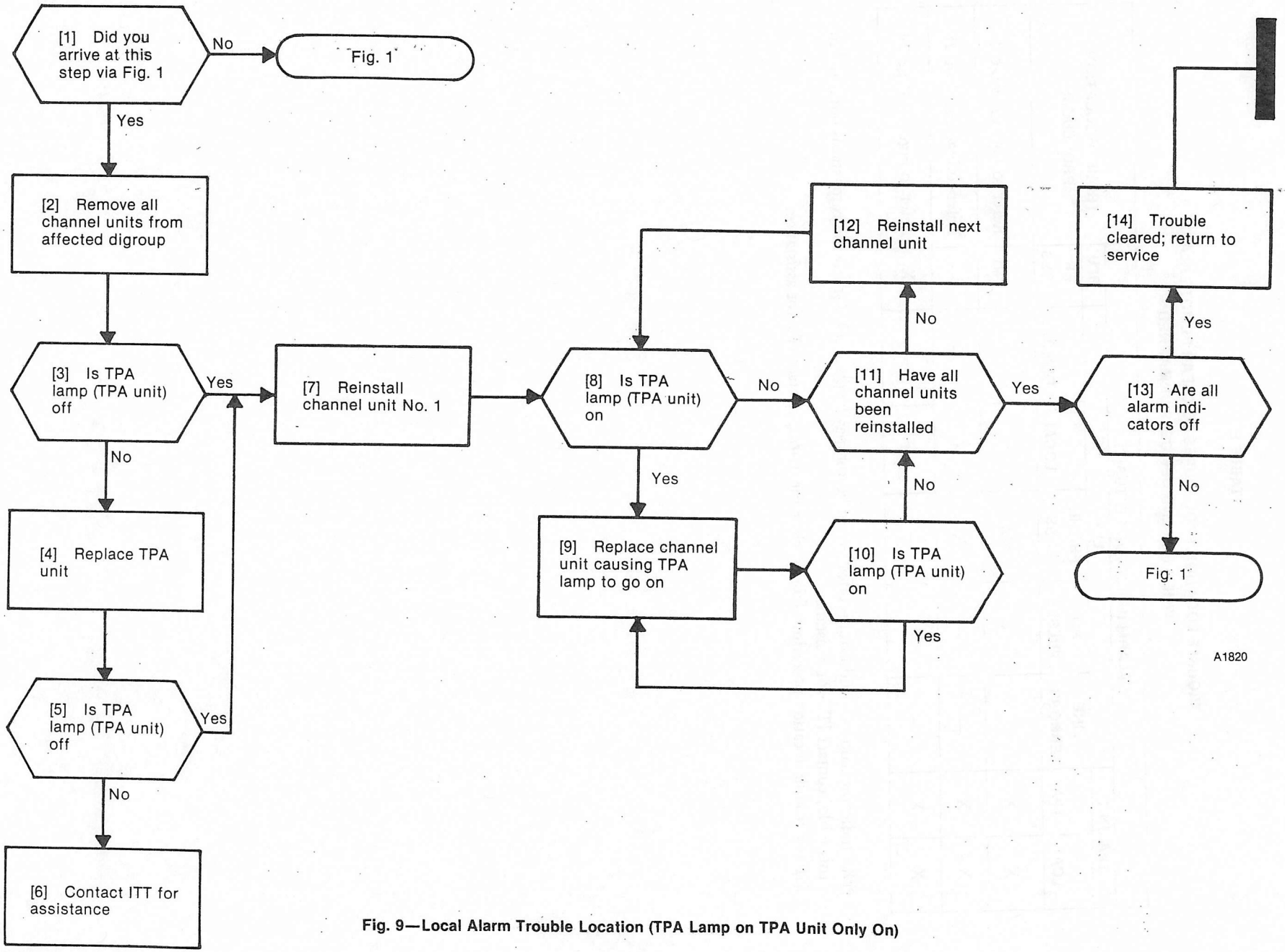

Fig. 9—Local Alarm Trouble Location (TPA Lamp on TPA Unit Only On)

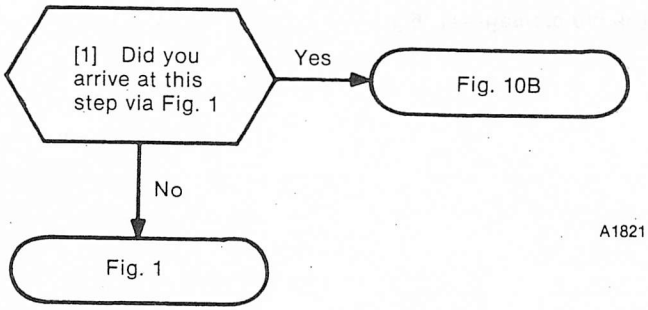

Fig. 10A—Remote Alarm Trouble Location — Far End Manned (NO PULSES LED on LI-2 On)

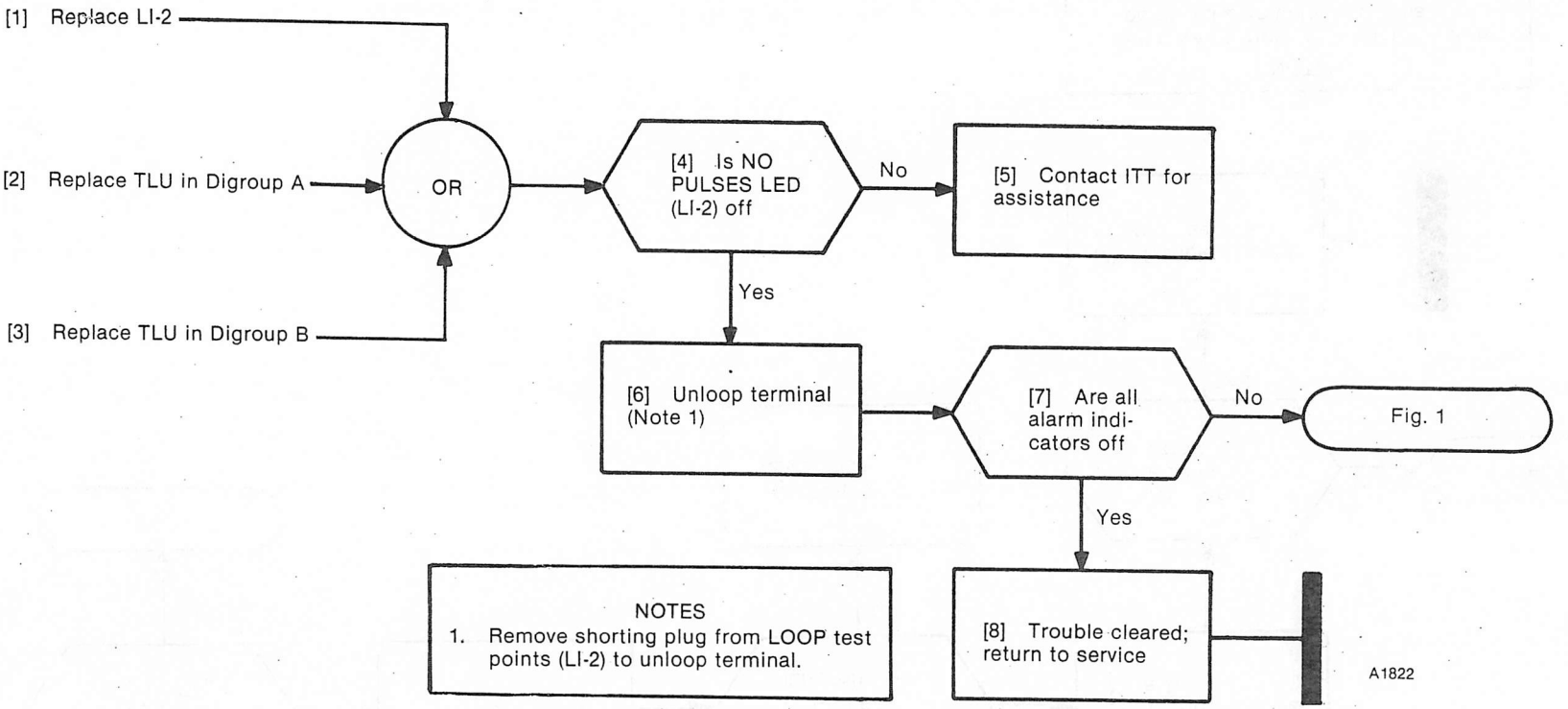

Fig. 10B—Remote Alarm Trouble Location — Far End Manned (NO PULSES LED on LI-2 On)

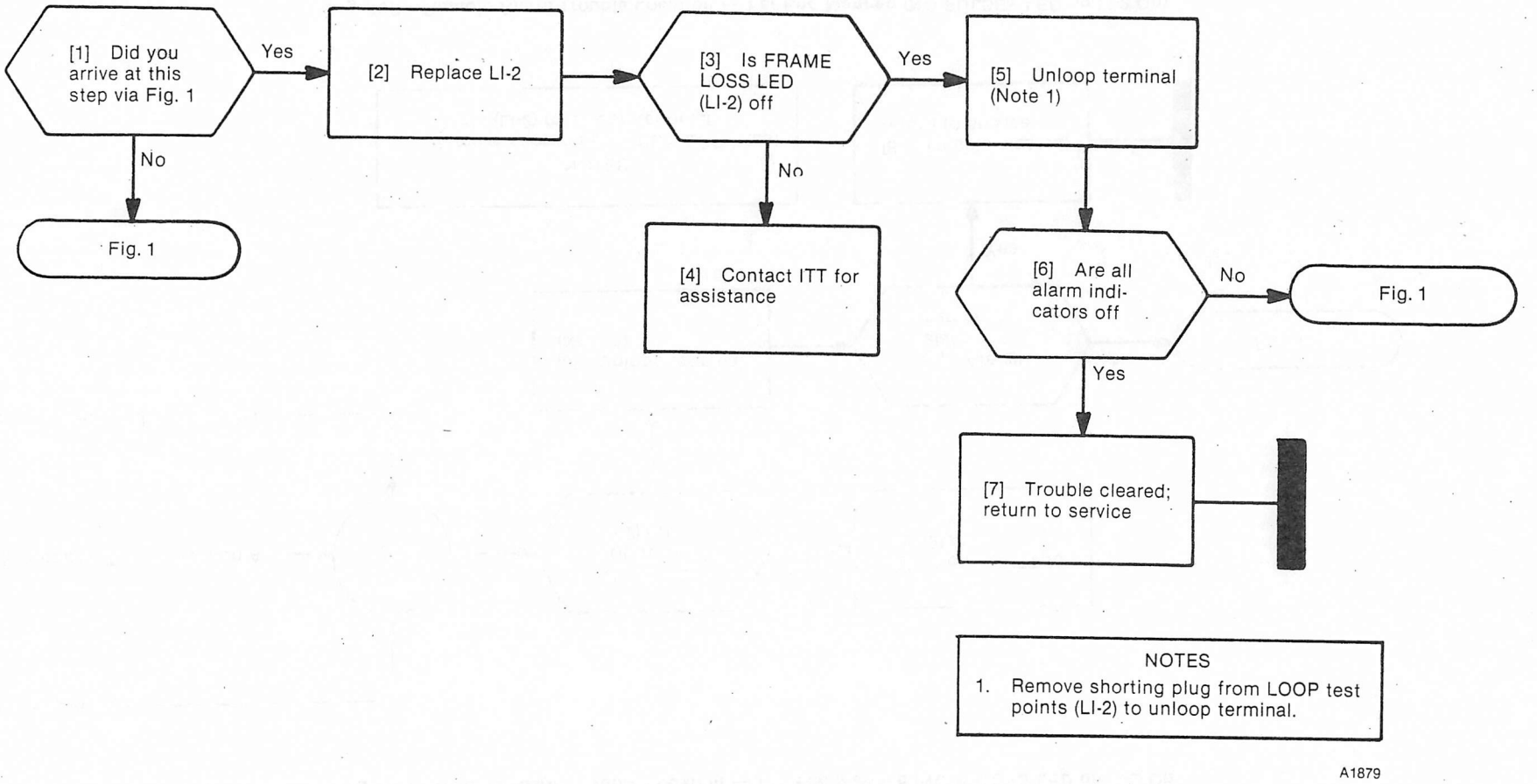

Fig. 11—Remote Alarm Trouble Location — Far End Manned (FRAME LOSS LED on LI-2 On)

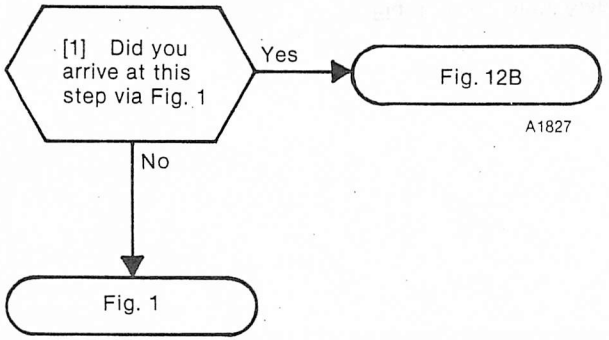

Fig. 12A—Remote Alarm Trouble Location — Far End Manned (FR LOSS LED on RLU On)

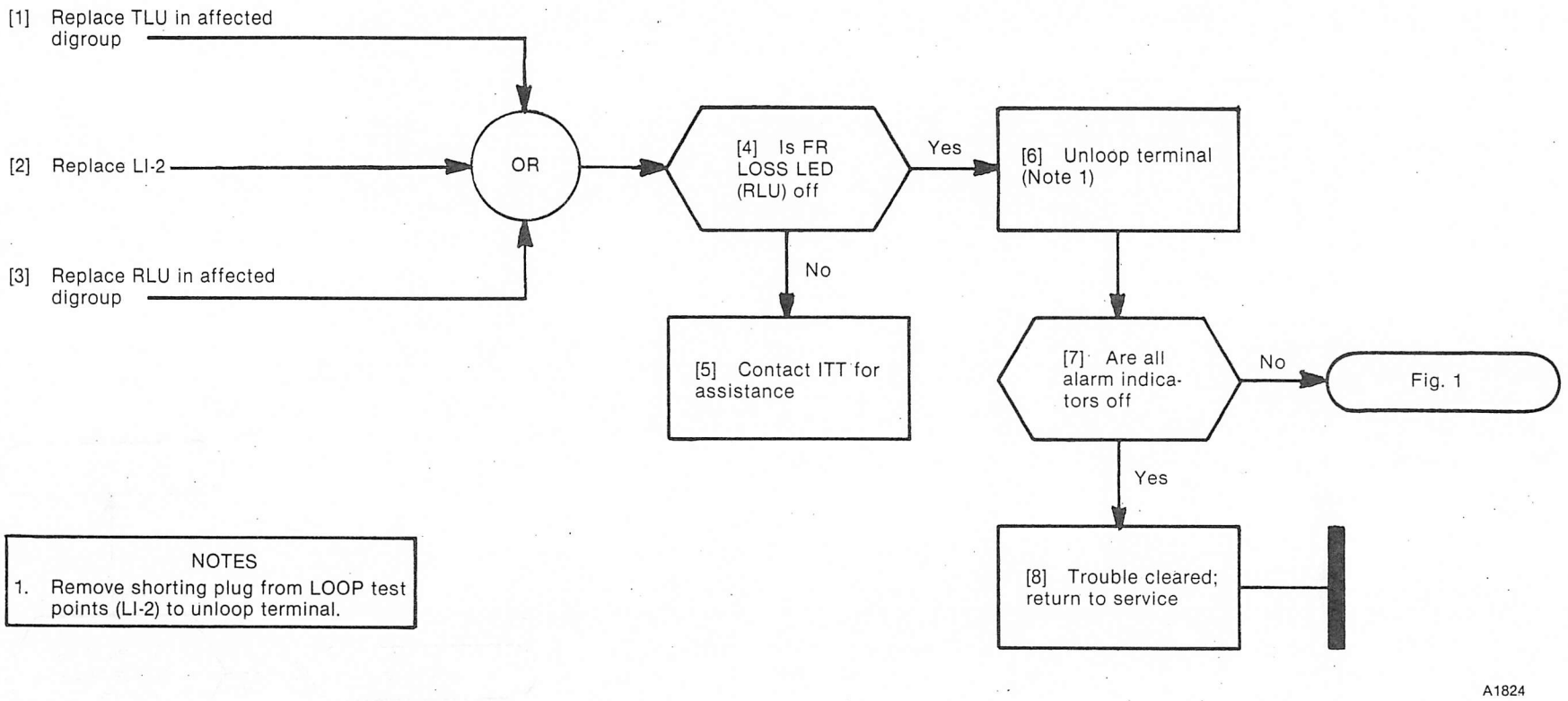

Fig. 12B—Remote Alarm Trouble Location — Far End Manned (FR LOSS LED on RLU On)

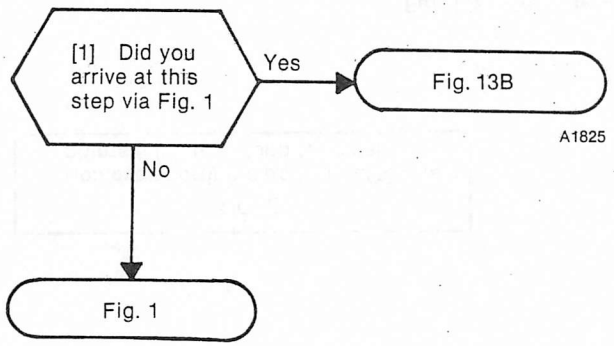

Fig. 13A—Remote Alarm Trouble Location — Far End Unmanned (NO PULSES LED on LI-2 On)

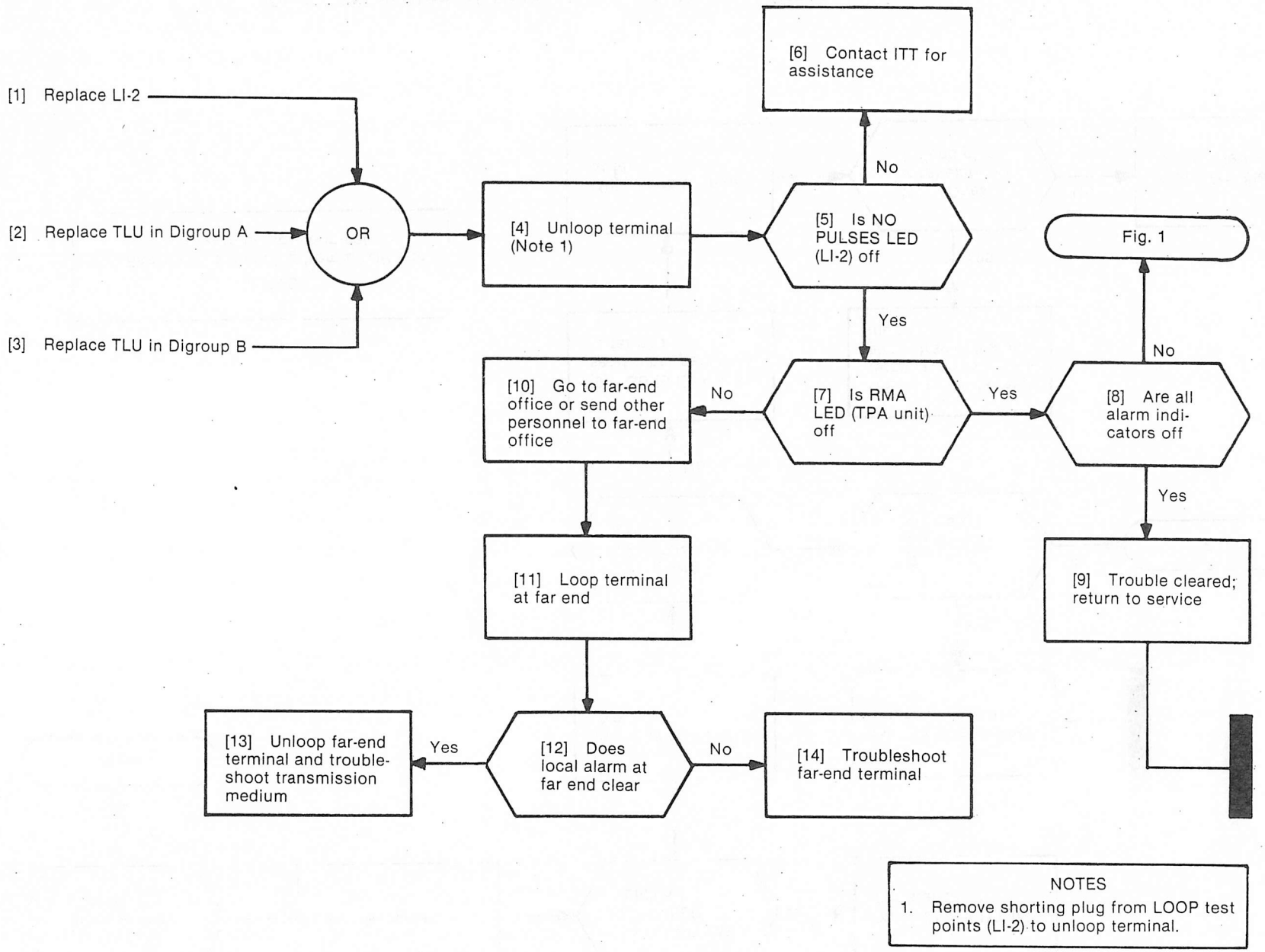
[1] Replace LI-2
[2] Replace TLU in Digroup A
[3] Replace TLU in Digroup B
OR
[4] Unloop terminal (Note 1)
[5] Is NO PULSES LED (LI-2) off
No
[6] Contact ITT for assistance
Yes
Fig. 1
No
[7] Is RMA LED (TPA unit) off
No
[10] Go to far-end office or send other personnel to far-end office
Yes
[8] Are all alarm indicators off
Yes
[11] Loop terminal at far end
[9] Trouble cleared; return to service
[12] Does local alarm at far end clear
Yes
[13] Unloop far-end terminal and troubleshoot transmission medium
No
[14] Troubleshoot far-end terminal
NOTES
1. Remove shorting plug from LOOP test points (LI-2) to unloop terminal.

Fig. 13B—Remote Alarm Trouble Location — Far End Unmanned (NO PULSES LED on LI-2 On) A1826

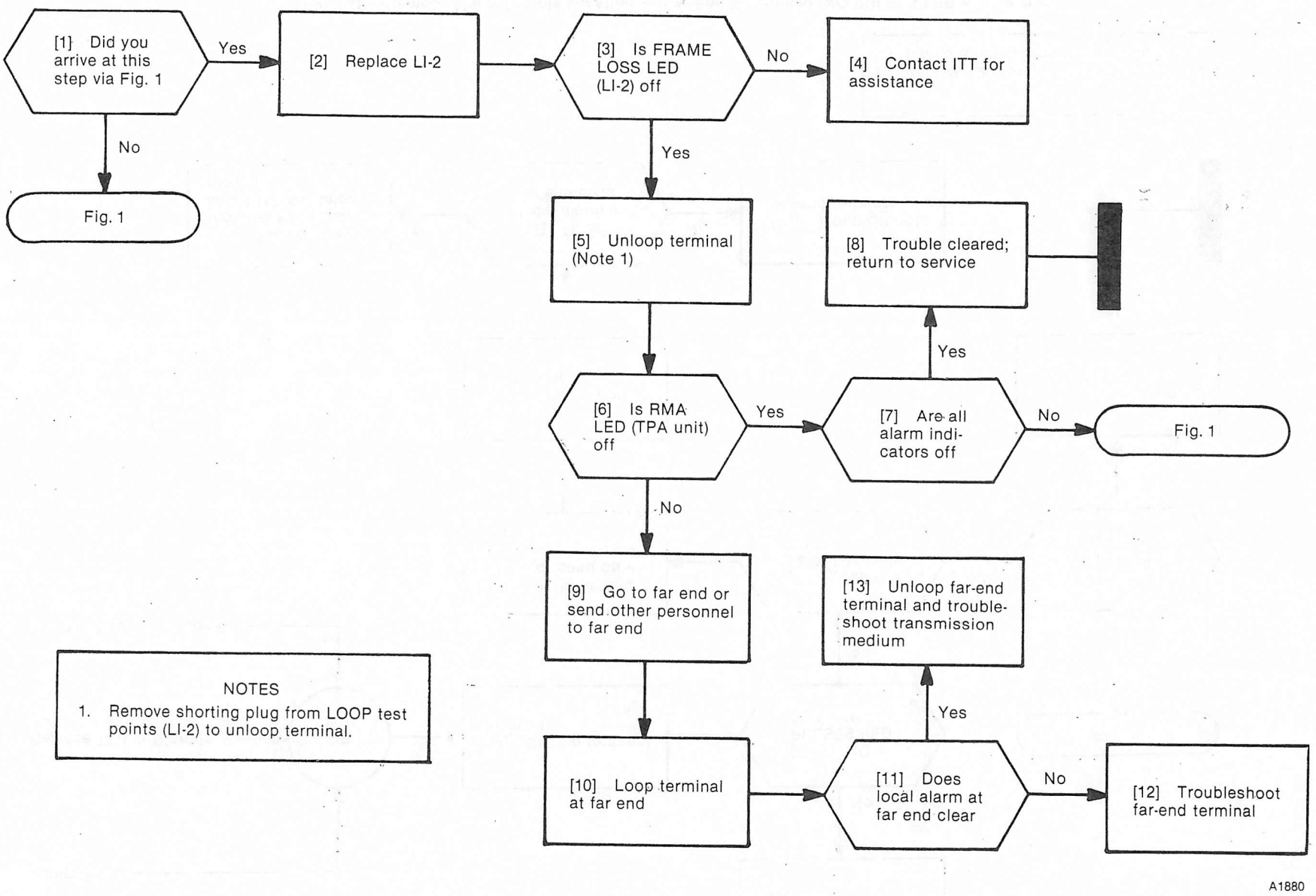
[1] Did you arrive at this step via Fig. 1
Yes
[2] Replace LI-2
[3] Is FRAME LOSS LED (LI-2) off
No
[4] Contact ITT for assistance
No
Fig. 1
Yes
[5] Unloop terminal (Note 1)
[8] Trouble cleared; return to service
Yes
[6] Is RMA LED (TPA unit) off
Yes
[7] Are all alarm indicators off
No
Fig. 1
No
[9] Go to far end or send other personnel to far end
[13] Unloop far-end terminal and troubleshoot transmission medium
Yes
[10] Loop terminal at far end
[11] Does local alarm at far end clear
No
[12] Troubleshoot far-end terminal
NOTES
1. Remove shorting plug from LOOP test points (LI-2) to unloop terminal.
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Fig. 14—Remote Alarm Trouble Location — Far End Unmanned (FRAME LOSS LED on LI-2 On)

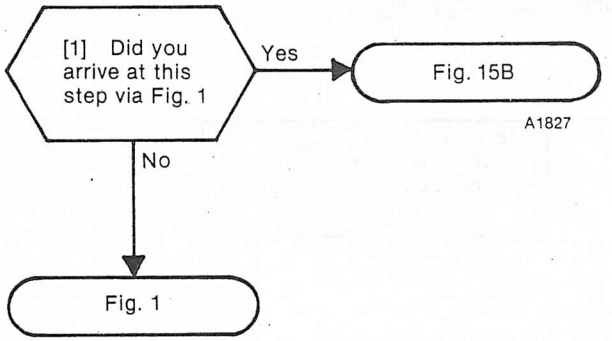

Fig. 15A—Remote Alarm Trouble Location — Far End Unmanned (FR LOSS LED on RLU On)

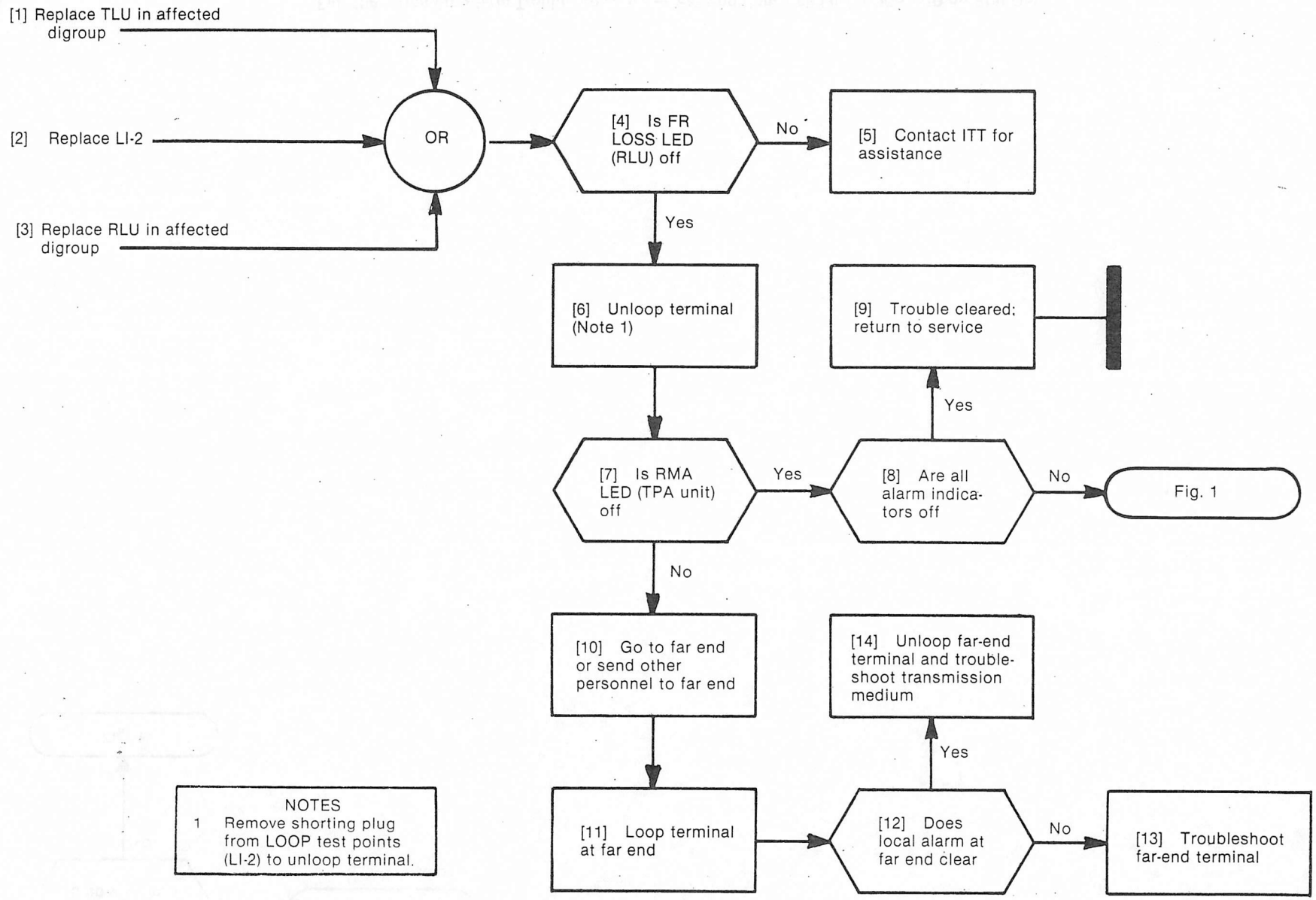
[1] Replace TLU in affected digroup
[2] Replace LI-2
[3] Replace RLU in affected digroup
OR
[4] Is FR LOSS LED (RLU) off
No
[5] Contact ITT for assistance
Yes
[6] Unloop terminal (Note 1)
[9] Trouble cleared; return to service
Yes
[7] Is RMA LED (TPA unit) off
Yes
[8] Are all alarm indicators off
No
Fig. 1
No
[10] Go to far end or send other personnel to far end
[14] Unloop far-end terminal and troubleshoot transmission medium
Yes
[11] Loop terminal at far end
[12] Does local alarm at far end clear
No
[13] Troubleshoot far-end terminal
NOTES
1 Remove shorting plug from LOOP test points (LI-2) to unloop terminal.

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Fig. 15B—Remote Alarm Trouble Location — Far End Unmanned (FR LOSS LED on RLU On)